Bonneville Power Administration, Ross Complex

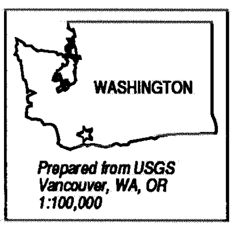
Vancouver, Washington
Region 10
WA1891406349

Site Exposure Potential

The Bonneville Power Administration's (BPA) Ross Complex in Vancouver, Washington is an active control center for the generation and transmission of electricity throughout the Pacific Northwest (Figure 1). Since its construction in 1939, the Ross Complex has provided research and testing facilities, as well as maintenance and operation capabilities for the BPA (U.S. DOE 1986).

A variety of waste materials have been generated at the site, including transformer and capacitor oils containing PCBs, organic and inorganic compounds used for preserving wood poles, paints, solvents, waste oils, and other materials contaminated with organic and inorganic chemicals. These wastes have been discharged or disposed of throughout the BPA site, including the capacitor test site, the Fog Chamber dump, the Cold Creek fill area, the laboratory drain field, the top coat test area, and the wood pole storage areas.

BPA is located on a terraced ridge between two small stream valleys: Cold Creek on the north and Burnt Bridge Creek on the west. These creeks merge 400 m west of the site before emptying into Vancouver Lake 3 km downstream of the site. Water from Vancouver Lake enters the Columbia River through Lake River and a flushing channel between the lake and the Columbia River.



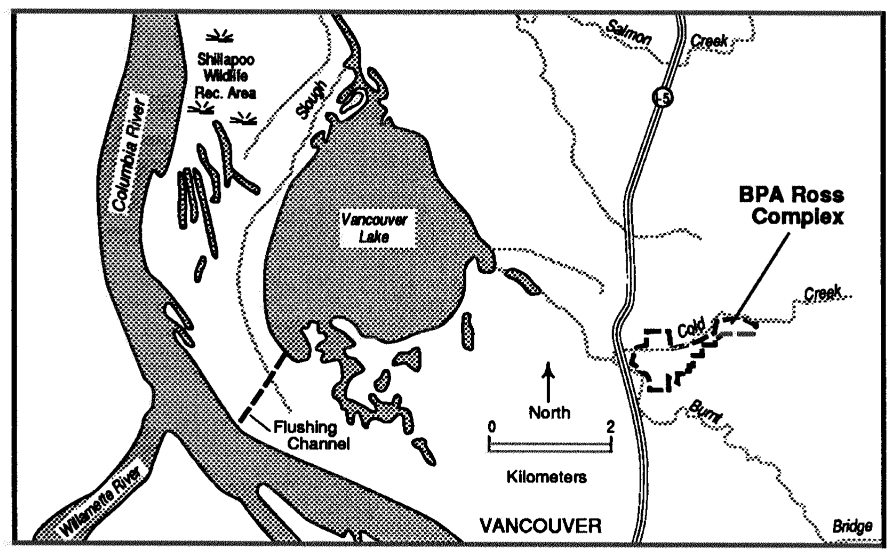


Figure 1. Bonneville Power Administration, Ross Complex, Vancouver, Washington.

Site Exposure Potential, *cont.*

Surface runoff from the site is directed through oil-water separators that remove oily contaminants before the water discharges to Cold Creek and Burnt Bridge Creek. Storm runoff not intercepted by the oil-water separators is discharged to open fields, Cold Creek, and Burnt Bridge Creek.

Groundwater at the BPA site occurs primarily in the Troutdale aquifer 30 to 45 m below ground. Although no shallow groundwater has been found on the site, some perched groundwater has been found in the clay, silt, and sand overlaying this deeper aquifer in nearby areas. The groundwater flow in the main aquifer beneath the site is generally to the southwest. Flow that would occur in a shallow system would probably discharge to Cold Creek (U.S. DOE 1986). Cold Creek originates as a groundwater discharge to the surface approximately 0.2 km north of the site (Battelle 1988).

The primary pathways of contaminant transport to NOAA resources or habitats are surface runoff to on-site creeks and the leaching of contaminants from fill areas adjacent to surface water. Groundwater may also represent a potential migration pathway, but insufficient information is available to evaluate its significance.

Site-Related Contamination

Groundwater, surface water, soil, and sediment samples were collected during the preliminary assessment (U.S. DOE 1986) and subsequent site investigations (Battelle 1988). Based on the limited data collected during these investigations, the contaminants of most concern to NOAA are lead, mercury, silver, zinc, and PCBs. Copper may also be of concern because high concentrations have been detected in on-site soil. Maximum concentrations of contaminants in various matrices sampled are presented together with available screening levels in Table 1 (U.S. DOE 1986; Battelle 1988).

The maximum concentration of lead was measured in surface water samples collected from Cold Creek, downstream from the fill area during the 1988 site investigation (Battelle 1988). Silver was measured at high levels from Cold Creek downstream from the Construction and Services Building during the preliminary assessment (U.S. DOE 1986). High concentrations of arsenic,

Site-Related Contamination, *cont.*

Table 1. Maximum concentrations of major contaminants near the site compared with applicable screening levels.

	Water			Soil		Sediment	
	Ground-water µg/l	Surface Water µg/l	AWQC[1] µg/l	Soil mg/kg	Average U.S. Soil [2] mg/kg	Sediment mg/kg	ER-L[3] mg/kg
INORGANIC SUBSTANCES							
arsenic	<10	<5	190	50	5	16	33
chromium	NT	0.5	11	460	100	20	80
copper	NT	1	12+	37,000	30	19	70
lead	13	10	3.2+	1,300	10	32	35
mercury	<0.5	<0.5	0.012	0.76	0.03	0.05	0.15
silver	NT	2.5	0.12	0.13	0.05	0.12	1.0
zinc	NT	76	110+	1,100	50	116	120

1: Ambient water quality criteria for the protection of aquatic life, freshwater chronic criteria presented (EPA 1986).
2: Lindsay (1979)
3: Effective range-low; the concentration representing the lowest 10 percentile value for the data in which effects were observed or predicted in studies compiled by Long and Morgan (1990)
+ Hardness-dependent criteria; 100 mg/l $CaCO_3$ used.
NT: Not analyzed

chromium, copper, and lead were detected in soil taken from the fog chamber dump. Concentrations of mercury, silver, and zinc were measured in a soil sample collected from a surface drain in the Cold Creek fill area.

No PCB analyses were performed on groundwater samples. Trace amounts of PCBs were detected in surface water from Cold Creek downstream of the fill area. The highest concentrations of PCBs in soil were found in samples from the capacitor testing yard. Elevated levels were also found in the soil collected from the landfill surface drain. PCB concentrations were below the detection limit in Cold Creek sediment collected downstream of the surface drain discharge.

Measurements of organic compounds in groundwater indicated the presence of some organic contamination but at low levels with respect to NOAA concerns. Benzene was the only organic compound detected in surface water samples and occurred at very low levels. PCP and numerous PAHs associated with creosote were present at low concentrations in soil from wood pole storage areas. No volatile or semi-volatile organic compounds were detected in sediment from Cold Creek; however, the number of samples taken was very small. PCP was not detected in groundwater or surface water samples. No PCP analyses were performed on Cold Creek sediment.

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NOAA Trust Habitats and Species

The habitats of most concern to NOAA are all freshwater, including Cold Creek, Burnt Bridge Creek, and Vancouver Lake. Cold Creek and Burnt Bridge Creek are small streams 2-5 m wide, less than one meter deep, and with gravel and sandy substrates, respectively. Cold Creek has been channelized as it crosses the BPA site. Burnt Bridge Creek drains a larger, more developed area but is usually dry during periods of low precipitation (Battelle 1988; Starkes personal communication 1990).

Vancouver Lake is a shallow, weedy lake serving as waterfowl habitat. In the early 1980s, the lake was dredged to a depth of approximately three meters and a channel was constructed between the Columbia River and the east end of Vancouver Lake to increase flushing (Roller personal communication 1990).

Species in Vancouver Lake of special interest to NOAA include chinook salmon, coho salmon, steelhead trout, cutthroat trout, and white sturgeon. Chum salmon are no longer found in Burnt Bridge and Cold creeks because of habitat degradation caused by residential and commercial development in the lower watershed, and agricultural runoff in the upper watershed. Coho salmon, steelhead trout, and cutthroat use Burnt Bridge and Cold creeks for spawning and nursery habitat. However, populations of these fish are very small due to habitat degradation. Although some chinook salmon may enter these streams, no spawning occurs there. Juvenile sturgeon are found in Vancouver Lake and the lower reaches of Burnt Bridge Creek, where the water flow is slowed by "backup" from the lake (Roller personal communication 1990; Van Tussenberg personal communication 1990).

There are no commercial fisheries of NOAA trust resources near the site. The only commercial fishery in the area is for carp in Vancouver Lake. Recreational fishing occurs in Cold Creek, Burnt Bridge Creek, and Vancouver Lake, mainly for freshwater species (blue gill, black and white crappie, and catfish). Salmon and trout populations are too limited to support a recreational fishery (Van Tussenberg personal communication 1990).

No federally protected species are known to frequent nearby habitats of concern, although recreational fishermen are attempting to have endangered-species status conferred upon the Lower

NOAA Habitats and Species, *cont.*

River wild chinook, Snake River fall-run chinook, and Upper Columbia summer-run chinook (Roller personal communication 1990).

References

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